BADMC

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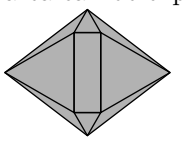
1 Problems

1. Find $\frac{1}{0.1} + \frac{2}{0.2} + ... + \frac{9}{0.9}$

2. If all triangles are equilateral and the rectangle is 10 by 30, the shaded area can be expressed as $a + b\sqrt{c}$. Find $a + b + c$.



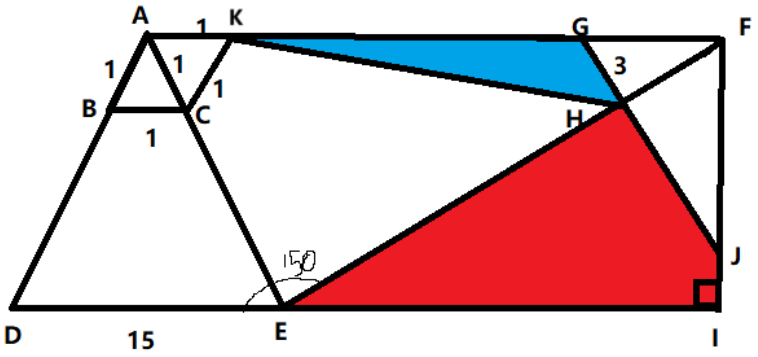
3. Find $\sum_{x=-1000}^{1000} \lfloor \sqrt[3]{x} \rfloor$

4. Find the sum of all values of n such that $\sqrt{n^{n^n}}$ is an integer and $1 \leq n \leq 100$

5. Find $\gcd(95040, 9995000400, 999995000004000)$.

6. Order the numbers below in increasing order. Write your answer as a permutation of 1234.
   1) 0.5^{100}
   2) 0.12^{30}
   3) 0.9^{314}
   4) 0.2^{51}

7. If $BC \parallel DE$ and $GJ \parallel AE$, the sum of the areas of the blue and red regions in the diagram below can be expressed as $\frac{a\sqrt{b}}{c}$ where b is square-free and $\gcd(a, c) = 1$. Find $a + b + c$.



8. How many factors of 10! have a units digit of 1?

9. Find the area of a triangle with side lengths $\sqrt{53}, \sqrt{13}, 5\sqrt{2}$ rounded to the nearest tenth.

10. There are 45 weights with $6, 10, 15$, and 30 pounds (180 weights in total). How many ways are there to place these weights on a scale so the total weight is 300 pounds?

11. The numbers $187, 665, 547, 069$, and 420 are concatenated in a specific order to form a number n divisible by 13. If n can start with a 0, find the smallest possible value of n.

12. Find the smallest integer n such that $n! > 5^n$